DETAILED ACTION

1. The Request for Continued Examination received 01/24/2011, indicates the amendment received 12/17/2010 as the required submission (the “amendment”). In the amendment, Applicant has amended claims 21, 23, 32, 41 and 42.

Claims 21, 23-27, 31-33 and 38-42 are pending.

Response to Arguments

2. Applicant’s arguments in the request, with regard to the rejections of the claims under 35 U.S.C. 103(a), have been considered but are moot in view of the new grounds of rejection.

Claim Objections

3. Claim 21 is objected to because of the following informalities:

- In the 23rd line of claim 21, please amend as follows: “device; [[and]]”.
- In the 25th line of claim 21, please amend as follows: “devices; <u>and</u>”.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims **21, 23-27 and 33** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Allon et al.** (US Pat. No. 5539883) ("Allon") in view of **King et al.** (US Pub. No. 20040162945) ("King"), and further in view of **Elliott** (US 6456599 B1), and further in view of **Valdevit et al.** (US 20040024908 A1) ("Valdevit").

With regard to claim **21**, Allon teaches: In an automation network comprising a plurality of nodes, each node comprising one or more connections to connect each node to one or more devices and one or more other nodes, a method for reconstruction of the network on a decentralized basis when replacing a device, the method comprising:

(a) identifying, by each device in the network in a distributed manner, an order of devices in the network defining a relationship based on predefined hierarchies of connections for each node

(i.e., computers in a network are logically linked in a hierarchical tree structure (Figure 2A-C; column 4, lines 16-31). Each of the computers comprises a means for storing information (column 6, lines 14-28) which may be a recording medium (column 16, lines 46-48). The information stored in each computer contains a number of entries, each entry containing information regarding the number of links in the tree separating a particular computer from the computer in which the information is stored, and the rank of the particular computer, logically linked to the computer in which the information is stored, from which the entry was last received (column 5, lines 22-32). Each computer performs steps to build the tree (column 7, lines 28-29). Logical links are generated

between the computer and other computers in the network so that a tree structure is formed, the computer being logically linked to one computer higher up the tree and a number of computers lower down the tree (Abstract). The generation of the logical links can be achieved by assigning a rank to each computer, no two computers being assigned the same rank, each computer being logically linked to one computer of lower rank and a number of computers of higher rank to form the tree structure (column 4, lines 42-47)),

comprising, correspondingly for each device in the network:

(i) identifying a corresponding device's associated node

(i.e., each of the computers comprises a means for storing information (column 6, lines 14-28) which may be a recording medium (column 16, lines 46-48). Each computer periodically sends an update_up message to its parent and waits for an update_down message (Figures 3A-C; column 8, lines 40-42). If an update_up message arrives from a child, the node responds with an update_down message (column 8, lines 46-47)).

<u>Allon does not disclose, but King teaches</u>:

(ii) determining the order of devices by ascertaining, for the corresponding device's associated node, a number of connections and a predefined hierarchy for the connections, which of the number of connections is connected to the corresponding device and a hierarchy for that connection, and which of the number of connections are still occupied and connected to other nodes and other devices and the hierarchies for those connections

(i.e., in an apparatus including a hierarchy of field replaceable units (FRUs), each FRU in the hierarchy may have a number of subsidiary FRUs, each of a particular type. A FRU includes stored FRU identity data, relating to or describing the FRU itself, and subsidiary FRU data that is indicative of at least the number and type of any subsidiary FRUs that may be immediately below the in the hierarchy. The apparatus is operable to provide a consolidated version of the FRU identity data and subsidiary FRU data stored by the various FRUs in the hierarchy (Figure 6; [0008]). For example, in a system 10, a chassis 15 receives 910 an initial request from a service processor for consolidated FRU data, and forwards 940 the request to each of its subsidiary FRUs including blades 40 (Figure 10; [0108]), which in turn forwards 940 the request for FRU data to its subsidiary FRUs disk unit 515 and RAM 540, each of which responsively returns 960 its FRU data 710 to the blades 40 ([0110]), which in turn returns 960 to chassis 15 the blades' consolidated FRU data 710 which comprises not only the FRU data 710 stored within blade 40 itself but also the FRU data 710 just received 950 from its subsidiary FRUs disk unit 515 and RAM 40 ([0111]). Chassis 15 now receives the consolidated FRU 710 data from blades 40, and well as the FRU data 710 from PSUs 51 and SSCs 52. This represents the complete set of FRU data for the system 10, which can then be returned to the service processor (step 960) in response to the original request ([0112]));

and

(iii) <u>distributively</u> storing the order of devices in the corresponding device

(i.e., for blade 40 the FRU history information is kept in an EEPROM 518. The FRU history for RAM 540 is stored in SEEPROM 542, while for disk unit 515 the FRU history is handled by disk controller 513 (Figure 5; [0072])).

Based on Allon in view of King, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of King with the claimed subject matter as taught by Allon, in order to help to isolate a fault in the apparatus (King at [0009]).

Allon in view of King does not disclose, but Elliott teaches:

wherein the order of devices stored in each device in the network in accordance with (i) - (iii), comprises the order of all of the devices including direct and indirect relationships between all of the devices;

(i.e., In link-state routing protocols, each node distributes a list of its actual neighbor nodes, along with a link metric from itself to the actual neighbor nodes, to other nodes in the network. This information is used to build a full "map" of the network topology in each distributed node (Figure 2C; column 4 lines 49-64). A network node apparatus includes a memory which stores link-state information regarding neighboring nodes in a network (column 3 lines 13-21)).

Based on Allon in view of King and further in view of Elliott, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Elliott with the claimed subject matter as taught by Allon in view of King, in order to derive how

messages/packets should be forwarded through the network (Elliott at column 4 lines 49-64).

Each of Allon and Elliott further teaches:

(b) upon replacing a first device with a replacement device by connecting the replacement device to a first node in place of the first device, identifying, by the replacement device, its associated node and which of the other devices is a neighbor of the replacement device

(i.e., Allon teaches: in the hierarchical tree structure, a dead node is detected, and a new node is added, because nodes fail (column 8, lines 34-39). When a computer is added to the network, the computer looks for a parent computer (column 8, lines 54-55; column 7, lines 1-6). Each node receives information from the nodes to which it is linked in the tree structure. Information on nodes in another sub-tree can reach any node (column 10, lines 25-34). Each node receives information from the nodes to which it is linked in the tree structure. Information on nodes in another sub-tree can reach any node (column 10, lines 25-34))

(i.e., Elliott teaches: FIG. 2C illustrates a network configuration where a "New Node" is introduced (column 4 lines 49-64). A given node typically finds itself with "potential neighbor" nodes with which it can directly communicate, but which are not predefined or currently linked with the node. The given node also finds itself with "actual neighbor" nodes, which are predefined or currently linked with the given node (column 1 lines 12-29)).

Valdevit also teaches:

(i.e., When there is a change in the state of an inter-switch link (ISL) (addition of removal), the change is reflected in the link state records (LSRs) of the switches (addition or removal of an entry) that detects the change ([0018], [0008], [0009]). FIG. 3 depicts the standardized process for synchronizing the topology databases of the switches in the fabric. The process begins in step 30 when an ISL forms between a pair of switches ([0015]). Each switch detects when a physical connection is made to a neighboring switch ([0015])).

Based on Allon in view of King and further in view of Elliott and further in view of Valdevit, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Valdevit with the claimed subject matter as taught by Allon in view of King and further in view of Elliott, in order for data frames to be routed accurately and efficiently through the fabric (Valdevit at [0014]).

Each of Elliott and Valdevit further teaches:

(c) receiving, by the replacement device, locally from the neighbor of the replacement device, the stored order of all of the devices;

(i.e., Elliott teaches: To route messages over a network, each node maintains information (e.g., a database) regarding the network topology. A network topology is defined by a series of "snapshots" which are issued from each node in the network. Snapshots can be routed or flooded through the network by the cluster heads. Preferably, there are two types of snapshots: link-state and affiliation. Link-state snapshots are issued by a cluster head, for example, when: i) its set of backbone links

change; [and] ii) its metrics to one of its backbone links or cluster member changes (Figure 2A; column 6 lines 35-46))

(i.e., Valdevit teaches: In step 36 the switches exchange their topology databases which includes the LSRs describing all of the ISLs each switch knows about ([0016]). In step 38 once a switch has sent all of its topology database to its new neighbor, the switch sends a final frame that is precoded to indicate to the neighbor that the neighbor has received all of the topology database. Once the end of the database exchange sequence frame is received, the neighbor responds back with an acknowledgment frame indicating that it has received the entire topology database ([0016]))

reconstructing the network on a decentralized basis using the stored order of all of the devices received from the neighbor.

(i.e., Elliott teaches: Since each node has a snapshot database (including actual and potential neighbors), a shortest path tree with itself as the root and all other nodes (via affiliated cluster heads) as branches is created by the node (column 8 lines 17-35))

(i.e., Valdevit teaches: For each change in the LSR of a switch, the switch needs to update its LSR ([0018]). Each switch updates its own LSR to include the connectivity information regarding the newly established ISL ([0016])).

With regard to claim **23**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Allon further teaches:

wherein each device determines which of the other devices is an upstream neighbor and which of the other devices is a downstream neighbor based on the stored order

(i.e., the information stored in each computer contains a number of entries, each entry containing information regarding the number of links in the tree separating a particular computer from the computer in which the information is stored, and the rank of the particular computer, logically linked to the computer in which the information is stored, from which the entry was last received (column 5, lines 22-32). The network tree building process is executed by each node in the network to determine its place in the network as a downstream or upstream node (col. 7 lines 1-18)).

Elliott further teaches:

wherein each device determines which of the other devices is an upstream neighbor and which of the other devices is a downstream neighbor based on the stored order of all of the devices

(i.e., With reference to FIG. 2A, one illustrated cluster includes nodes A, a, b, c and d, with node A serving as the cluster head. Similarly, members E, e, f and g, with node E serving as the cluster head, define another illustrated cluster. Nodes B, C and D are each considered individual cluster groups, as well as cluster heads for their respective group (column 4 lines 18-24). A node periodically issues a beacon announcing its presence and supplying network information. FIG. 7 is a diagram illustrating a possible format for a cluster head beacon message (e.g., a beacon issued

by a cluster head). The illustrated cluster head beacon includes three main categories of information; namely, a Cluster Beacon Header, a Potential Neighbor List, and a Cluster Member List (column 8 lines 53-60). The Cluster Beacon Header identifies the node issuing the beacon. The information can include a cluster head node ID, a network ID, the status of the node, organization affiliation (e.g., command, support, administrative function, etc.), and a partition ID (if any) (column 8 lines 61-65). The Cluster Member List identifies those nodes that are affiliated with the cluster head. This member list can include non-gateway nodes (e.g., nodes a-d in FIG. 2A), gateway nodes (e.g., nodes C and E in FIG. 2A), or a combination of the two. The Cluster Member List includes fields directed to the number of cluster members and actual cluster member entries. The Number of Cluster Member field contains the current number of members that are affiliated with the cluster head, and the Cluster Member Entry field identifies the members that are currently affiliated with the cluster head. Each of the Cluster Member entries includes the cluster members' node ID, and a quality index calculated by the cluster head. The quality index allows other nodes in the network to evaluate the links between the particular cluster head and the cluster member (column 8 line 66 – column 9 line 13)).

Therefore, the limitations of claim 23 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

With regard to claim **24**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Allon further teaches:

wherein each step of the method is repeated periodically

(i.e., the periodic distribution of the network tree information across the network, is used by each node to determine its placement in the network as well as the placement and status of all other nodes in the network, col. 4 lines 15-31, col. 5 lines 12-21 and lines 62-67).

Therefore, the limitations of claim 24 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

With regard to claim **25**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Allon further teaches:

wherein the recited steps are repeated whenever any one of said other devices is no longer connected to the network

(i.e., the network tree maintenance process takes place to recognize dead or new nodes on the network, col. 8 lines 35-59).

Therefore, the limitations of claim 25 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

With regard to claim **26**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Allon further teaches:

wherein the recited steps are repeated whenever a new device is connected to the network

(i.e., the network tree maintenance process takes place to recognize dead or new nodes on the network, col. 8 lines 35-59).

Therefore, the limitations of claim 26 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

With regard to claim **27**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Allon further teaches:

wherein the recited steps are repeated whenever any one of said other devices is replaced by a new device

(i.e., the network tree maintenance process takes place to recognize dead or new nodes on the network as well as replacing and rebooting a node, col. 8 lines 21-26 and 35-59).

Therefore, the limitations of claim 27 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

With regard to claim **32**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Elliott further teaches:

wherein the step of identifying the order of devices to establish a relationship includes determining IP addresses of all the other devices

(i.e., FIG. 6A is a diagram showing a format of a link-state snapshot, without potential neighbor information. Possible fields include Source Node ID, Number of Backbone Links and Backbone Link entry (column 6 lines 47-63). The Source ID is a unique identifier or node-address for the issuing cluster head (column 6 lines 47-63). Each Backbone Link field conveys information about one of the in-service links from the issuing cluster head to an affiliated (or connected) cluster head. The field preferably contains the affiliated cluster head's node or address ID and the most up-to-date metric (as discussed below) from the issuing cluster head to the affiliated cluster head (column 7 lines 16-22). The present invention can also optimize a system using packet message flows implemented atop an underlying switched virtual-circuit network (e.g., IP over ATM, or other Multi-Protocol Label Switched messaging systems). Here IP routers would form neighbor relationships (via ATM or MPLS circuits) with some subset of their potential "one IP hop" neighbors, but advertise all possible neighbors. As needed, full

neighbor relationships would be formed in response to traffic flows, i.e., circuits would be set up to convey messages between one IP router and a potential "one IP hop" neighbor. Such circuits would be torn down when no longer needed (i.e., when it would be more efficient to remove this neighbor relationship from the IP network topology) (column 11 line 57 – column 12 line 3)).

Therefore, the limitations of claim 32 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

With regard to claim **33**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Allon further teaches:

wherein the method is executed by a computer program product (column 16, lines 46-48).

Therefore, the limitations of claim 33 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

With regard to claim **39**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Elliott further teaches:

wherein the network is an Ethernet containing personal computers or peripherals as devices

(i.e., A communication node 2 is shown in FIG. 1. The node 2 includes a central processing unit (CPU) 3, a memory 4 suitable for storing computer executable software therein, a power supply 5, a transceiver 6, RAM 7 and ROM 8. The communications node 2 can also include an Ethernet interface (column 6 lines 15-34)).

Therefore, the limitations of claim 39 are rejected in the analysis of claim 21, and the claim is rejected on that basis.

6. Claim **31** is rejected under 35 U.S.C. 103(a) as being unpatentable over Allon in view of King and further in view of Elliott and further in view of Valdevit, and further in view of **Liu et al.** (U.S. Pat. No. 6574664) ("Liu").

With regard to claim **31**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

<u>Allon in view of King and further in view of Elliott and further in view of Valdevit does not disclose, but Liu teaches</u>:

wherein determining which of the number of connections are still occupied and connected to other nodes and other devices is performed with MAC addresses

(i.e., a discovery procedure utilizes MAC addresses to discover nodes or devices connected to one another on a network (column 2, lines 23-34)).

Based on Allon in view of King and further in view of Elliott and further in view of Valdevit and further in view of Liu, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Liu with the claimed subject matter as taught by Allon in view of King and further in view of Elliott and further in view of Valdevit, in order to provide IP and MAC addresses of devices on a network, to application programs (Liu at column 2, lines 35-45).

7. Claim **38** is rejected under 35 U.S.C. 103(a) as being unpatentable over Allon in view of King and further in view of Elliott and further in view of Valdevit, and further in view of **Talagala et al.** (U.S. Pub. No. 20020162075) ("Talagala").

With regard to claim **38**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

King further teaches:

applied to an automation system containing controls

(i.e., a switching and service controller (SSC) 52 ([0042])),

operator units,

(i.e., a user may run a configuration or set-up utility program on a service processor ([0115]) of the SSC ([0045]))

drives

(515 in Figure 6)

as the devices.

Allon in view of King and further in view of Elliott and further in view of Valdevit does not disclose, but Talagala teaches:

actuators as the devices

(i.e., a typical integrated disk controller may control the actuator and other internal components of a disk drive when writing data to or reading data from the disk ([0042])).

Based on Allon in view of King and further in view of Elliott and further in view of Valdevit and further in view of Talagala, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Talagala with the claimed subject matter as taught by Allon in view of King and further in view of Elliott and further in view of Valdevit, in order to protect against data loss (Talagala at [0055]).

8. Claim **40** is rejected under 35 U.S.C. 103(a) as being unpatentable over Allon in view of King and further in view of Elliott and further in view of Valdevit, and further in view of **Root et al.** (U.S. Pub. No. 20020050737) ("Root").

With regard to claim **40**, Allon in view of King and further in view of Elliott and further in view of Valdevit teaches: The method according to claim 21 (see discussion above).

Allon in view of King and further in view of Elliott and further in view of Valdevit does not disclose, but Root teaches:

applied to a network installed in a rail transport system containing traction vehicles and cars as the devices

(i.e., an electropneumatic (EP) train set-up initialization process consists of establishing or confirming the identity of all trainline devices, i.e., locomotives or cars, as well as the position and orientation of all EP equipped locomotives and cars. It also includes assignment of unique network addresses, collection of device information and downloading configuration information (Figure 6; [0047], [0023])).

Based on Allon in view of King and further in view of Elliott and further in view of Valdevit and further in view of Root, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Root with the claimed subject matter as taught by Allon in view of King and further in view of Elliott and further in view of Valdevit, in order to enhance safety (Root at [0063]).

9. Claims **41 and 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over Allon in view of Root and further in view of King and further in view of Elliott.

With regard to claim **41**, Allon teaches: In a reconfigurable network comprising a plurality of devices physically interconnected in a sequence, a method for identifying an order of devices in the network indicating relative spatial arrangements among the devices including directional information, wherein the network contains a number of nodes interconnected in a sequence corresponding to the interconnection of the

devices, and wherein each of the nodes has a number of connections for interconnecting the nodes and the devices, the method comprising:

configuring the network according to a first hierarchical arrangement of the connections which includes relationships among the nodes

(i.e., computers in a network are logically linked in a hierarchical tree structure (column 4, lines 16-31). For each of the computers, a link to a computer of lower rank is a link to a parent which is higher up in the tree, and a link to each of computers of higher rank is a link to a child which is lower down in the tree (column 7, lines 1-6; column 4, lines 16-31)).

Allon does not disclose, but Root teaches:

configuring the network according to a first hierarchical arrangement of the connections which includes relationships among the nodes indicating the relative spatial arrangements among the devices including directional information

(i.e., an electropneumatic (EP) train set-up initialization process consists of establishing or confirming the identity of all trainline devices, i.e., locomotives or cars, as well as the position and orientation of all EP equipped locomotives and cars. It also includes assignment of unique network addresses, collection of device information and downloading configuration information (Figure 6; [0047], [0023])).

Based on Allon in view of Root, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Root with the claimed subject matter as taught by Allon, in order to enhance safety (Root at [0063]).

Allon further teaches:

(i.e., an electropneumatic (EP) train set-up initialization process consists of establishing or confirming the identity of all trainline devices, i.e., locomotives or cars, as well as the position and orientation of all EP equipped locomotives and cars. It also includes assignment of unique network addresses, collection of device information and downloading configuration information (Figure 6; [0047], [0023])).

Based on Allon in view of Root, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Root with the claimed subject matter as taught by Allon, in order to enhance safety (Root at [0063]).

Allon further teaches:

by:

identifying, by each device in the network in a distributed manner, an order of devices in the network indicating a relationship based on predefined hierarchies of connections for each node,

(i.e., computers in a network are logically linked in a hierarchical tree structure (Figure 2A-C; column 4, lines 16-31). Each of the computers comprises a means for storing information (column 6, lines 14-28) which may be a recording medium (column 16, lines 46-48). The information stored in each computer contains a number of entries, each entry containing information regarding the number of links in the tree separating a particular computer from the computer in which the information is stored, and the rank of the particular computer, logically linked to the computer in which the information is

stored, from which the entry was last received (column 5, lines 22-32). Each computer performs steps to build the tree (column 7, lines 28-29). Logical links are generated between the computer and other computers in the network so that a tree structure is formed, the computer being logically linked to one computer higher up the tree and a number of computers lower down the tree (Abstract). The generation of the logical links can be achieved by assigning a rank to each computer, no two computers being assigned the same rank, each computer being logically linked to one computer of lower rank and a number of computers of higher rank to form the tree structure (column 4, lines 42-47)),

comprising, correspondingly for each device in the network:

(i) identifying a corresponding device's associated node <u>and type of device;</u>

(i.e., each of the computers comprises a means for storing information (column 6, lines 14-28) which may be a recording medium (column 16, lines 46-48). Each computer periodically sends an update_up message to its parent and waits for an update_down message (Figures 3A-C; column 8, lines 40-42). If an update_up message arrives from a child, the node responds with an update_down message (column 8, lines 46-47)).

<u>Allon in view of Root does not disclose, but King teaches</u>:

(ii) determining the order of devices by ascertaining, for the corresponding device's associated node, a number of connections and a predefined hierarchy for the connections, which of the number of connections is connected to the corresponding device and a hierarchy for that connection, and which of the number of connections are

still occupied and connected to other nodes and other devices and the hierarchies for those connections;

(i.e., in an apparatus including a hierarchy of field replaceable units (FRUs), each FRU in the hierarchy may have a number of subsidiary FRUs, each of a particular type. A FRU includes stored FRU identity data, relating to or describing the FRU itself, and subsidiary FRU data that is indicative of at least the number and type of any subsidiary FRUs that may be immediately below the in the hierarchy. The apparatus is operable to provide a consolidated version of the FRU identity data and subsidiary FRU data stored by the various FRUs in the hierarchy (Figure 6; [0008]). For example, in a system 10, a chassis 15 receives 910 an initial request from a service processor for consolidated FRU data, and forwards 940 the request to each of its subsidiary FRUs including blades 40 (Figure 10; [0108]), which in turn forwards 940 the request for FRU data to its subsidiary FRUs disk unit 515 and RAM 540, each of which responsively returns 960 its FRU data 710 to the blades 40 ([0110]), which in turn returns 960 to chassis 15 the blades' consolidated FRU data 710 which comprises not only the FRU data 710 stored within blade 40 itself but also the FRU data 710 just received 950 from its subsidiary FRUs disk unit 515 and RAM 40 ([0111]))

and (iii) <u>distributively</u> storing the order of devices in the corresponding device

(i.e., for blade 40 the FRU history information is kept in an EEPROM 518. The FRU history for RAM 540 is stored in SEEPROM 542, while for disk unit 515 the FRU history is handled by disk controller 513 (Figure 5; [0072])).

Based on Allon in view of Root and further in view of King, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of King with the claimed subject matter as taught by Allon in view of Root, in order to help to isolate a fault in the apparatus (King at [0009]).

Allon in view of Root and further in view of King does not disclose, but Elliott teaches:

wherein the order of devices stored in each device in the network in accordance with (i) - (iii), comprises the order of all of the devices including direct and indirect relationships between the devices

(i.e., In link-state routing protocols, each node distributes a list of its actual neighbor nodes, along with a link metric from itself to the actual neighbor nodes, to other nodes in the network. This information is used to build a full "map" of the network topology in each distributed node (Figure 2C; column 4 lines 49-64). A network node apparatus includes a memory which stores link-state information regarding neighboring nodes in a network (column 3 lines 13-21)).

Based on Allon in view of Root and further in view of King and further in view of Elliott, it would have been obvious to one having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Elliott with the claimed subject matter as taught by Allon in view of Root and further in view of King, in order to derive how messages/packets should be forwarded through the network (Elliott at column 4 lines 49-64).

Root further teaches:

indicating the relative spatial arrangements among all of the devices;

(i.e., the EP train set-up initialization process consists of establishing or confirming the identity of all trainline devices, i.e., locomotives or cars, as well as the position and orientation of all EP equipped locomotives and cars. It also includes assignment of unique network addresses, collection of device information and downloading configuration information (Figure 6; [0047], [0023])).

providing by each device in the network the directional information and the type of device for the other devices in the network

(i.e., the EP train set-up initialization process consists of establishing or confirming the identity of all trainline devices, i.e., locomotives or cars, as well as the position and orientation of all EP equipped locomotives and cars. It also includes assignment of unique network addresses, collection of device information and downloading configuration information (Figure 6; [0047], [0023])).

Elliott also further teaches:

providing by each device in the network the type of device for the other devices in the network

(i.e., To route messages over a network, each node maintains information (e.g., a database) regarding the network topology. A network topology is defined by a series of "snapshots" which are issued from each node in the network. Snapshots can be routed or flooded through the network by the cluster heads. Preferably, there are two types of snapshots: link-state and affiliation (Figure 2A; column 6 lines 35-46). An alternative format for a link-state snapshot is shown in FIG. 8. The FIG. 8 snapshot

includes a header, and both potential and actual neighbor information. Preferably, the list of actual and potential neighbors includes a node ID for each neighbor, and a metric associated with each neighbor node. In this manner, a complete network topology of both actual and potential neighbors is available to each node in the network (column 7 lines 49-65). The link-state snapshot of FIG. 8 can be distributed from a node based on the procedure illustrated in FIG. 10. As illustrated, a node waits for a predetermined time (S50) and then formulates an updated message (S51). The message can include node-ID, an Actual Neighbor Table, and a Potential Neighbor Table (S52a-S52c). After the message is formulated, it is transmitted from the node (S53) (column 7 line 66 – column 8 line 7). With reference to FIG. 2A, one illustrated cluster includes nodes A, a, b, c and d, with node A serving as the cluster head. Similarly, members E, e, f and g, with node E serving as the cluster head, define another illustrated cluster. Nodes B, C and D are each considered individual cluster groups, as well as cluster heads for their respective group (column 4 lines 18-24). A node periodically issues a beacon announcing its presence and supplying network information. FIG. 7 is a diagram illustrating a possible format for a cluster head beacon message (e.g., a beacon issued by a cluster head). The illustrated cluster head beacon includes three main categories of information; namely, a Cluster Beacon Header, a Potential Neighbor List, and a Cluster Member List (column 8 lines 53-60). The Cluster Beacon Header identifies the node issuing the beacon. The information can include a cluster head node ID, a network ID, the status of the node, organization affiliation (e.g., command, support, administrative function, etc.), and a partition ID (if any) (column 8 lines 61-65). The

Cluster Member List identifies those nodes that are affiliated with the cluster head. This member list can include non-gateway nodes (e.g., nodes a-d in FIG. 2A), gateway nodes (e.g., nodes C and E in FIG. 2A), or a combination of the two. The Cluster Member List includes fields directed to the number of cluster members and actual cluster member entries. The Number of Cluster Member field contains the current number of members that are affiliated with the cluster head, and the Cluster Member Entry field identifies the members that are currently affiliated with the cluster head. Each of the Cluster Member entries includes the cluster members' node ID, and a quality index calculated by the cluster head. The quality index allows other nodes in the network to evaluate the links between the particular cluster head and the cluster member (column 8 line 66 – column 9 line 13)).

With regard to claim **42**, Allon in view of Root and further in view of King and further in view of Elliott teaches: The method according to claim 41 (see discussion above).

Root further teaches:

wherein the network comprises a plurality of computer devices each positioned on a vehicle or car in a transport arrangement

(i.e., an integrated processor module IPM 27 may be integrated with a distributed power DP 14 to communicate via a radio module 33 to other locomotives in the consist and distributed throughout the train (Figures 3-5; [0031], [0030]). A connection between the IPM 27, a brake valve 26 and an electropneumatic control unit 20 is by a common

bus which may be an AAR standard LonWork Network wherein each of the modules is a node on the neural network ([0032]). A car ID node 45 is shown as a node on the network and is part of the EP-60 system ([0033]))

to provide passengers with the directional information and the type of device for the other devices in the network.

(i.e., The EP system can be initialized per the standard EP procedures. Menu selection and set-up options will be provided from the integrated locomotive computer (ILC 29) locomotive system integration (LSI) display 32 (Figures 1 and 3-5; [0045], [0024], [0014]). The EP train set-up initialization process consists of establishing or confirming the identity of all trainline devices, i.e., locomotives or cars, as well as the position and orientation of all EP equipped locomotives and cars. It also includes assignment of unique network addresses, collection of device information and downloading configuration information ([0047], [0023])).

Therefore, the limitations of claim 42 are rejected in the analysis of claim 41, and the claim is rejected on that basis.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Ogier et al. (US 20020062388 A1) discloses a network comprising a plurality of nodes in communication with each other over communication links. Each node maintains a path tree for each source node in the network that can

produce an update message. Each path tree has that source node as a root node, a parent node, and zero or more children nodes (Figures 1 and 4; [0014]).

- Boman et al. (US 20040215532 A1) discloses a reader 16 and a device 12' normally operating in a hierarchical star network topology, which may send and receive signals during a shipment phase in order to determine the particular location of the devices 12' affixed to cargo or containers 10. The devices may also send RSSI or TDOA information using autonomous so-called adhoc network functionality, i.e. being able to work and communicates in a topology were only the devices themselves communicate with one another, without a master (e.g., reader 16). The reader 16 receives position information from the device 12' and transmits the information to the server 15. The position information may, for example, be RSSI information, TDOA information, etc . . . The reader 16 may transmit the identification number of the device 12' and an estimated X-Y-Z position of the device 12'. An estimated direction of the cargo that is affixed with a device 12' may be generated by the server 15. The device may also transmit information programmed into the device 12' such as the license plate number, weight, etc. of the cargo. As mentioned above, if the estimated position of the device 12' is beyond the predetermined threshold, then an alarm may be generated. The server 15 forwards information to an onboard computer system 900 that monitors cargo movement (Figure 5; [0101]).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Isom whose telephone number is (571)270-7203. The examiner can normally be reached on 9:30 a.m. to 6:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Hwang can be reached on 571-272-4036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. I./
Examiner, Art Unit 2447
8/26/2011

/Karen C Tang/
Primary Examiner, Art Unit 2447